ABSTRACT

A plurality of computer nodes communicates using seemingly random IP source and destination addresses and (optionally) a seemingly random discriminator field. Data packets matching criteria defined by a moving window of valid addresses are accepted for further processing, while those that do not meet the criteria are rejected. In addition to "hopping" of IP addresses and discriminator fields, hardware addresses such as Media Access Control addresses can be hopped. The hopped addresses are generated by random number generators having non-repeating sequence lengths that are easily determined a-priori, which can quickly jump ahead in sequence by an arbitrary number of random steps and which have the property that future random numbers are difficult to guess without knowing the random number generator's parameters. Synchronization techniques can be used to re-establish synchronization between sending and receiving nodes. These techniques include a self-synchronization technique in which a sync field is transmitted as part of each packet, and a "checkpoint" scheme by which transmitting and receiving nodes can advance to a known point in their hopping schemes. A fast-packet reject technique based on the use of presence vectors is also described. A distributed transmission path embodiment incorporates randomly selected physical transmission paths.